

Common Logic

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Common Logic (CL) is a framework for a family of logic languages, based on first-order logic with the purpose of standardizing abstract syntax and semantics for knowledge representation (KR) and information interchange. CL is very expressive because it has been designed as a superset of many different notations.

The framework permits and encourages the development of a variety of different syntactic forms, called dialects sharing a single semantics. A dialect may use any desired syntax, but it must be possible to demonstrate precisely how the concrete syntax of a dialect conforms to the abstract syntax and semantics, which are based on a model theoretic interpretation. CL specification does not include any concrete syntactic forms. Specific form left to the KR designers. Once syntactic conformance is established, a dialect gets the CL semantics for free, as they are specified relative to the abstract syntax only, and hence are inherited by any conformant dialect. That is why we can perform meaning-preserving translations between dialects. However, some CL dialects may be more expressive than others. A given dialect need not use all the features of CL.

Common Logic has some novel features, chief among them being a syntax which is signature-free, type-free if needed and permits 'higher-order' constructions such as quantification over classes or relations while preserving a first-order model theory, and a semantics which allows theories to describe intensional entities such as classes or properties. CL was designed for easy, natural use on the web, so it also includes numerous web-oriented features. CL does not specify the inference rules but provide tools for expressing them in the dialects.

In 2007 CL became an ISO standard publicly available at [2]. The standard also includes three sample dialects:

- CLIF - Common Logic Interchange Format, based on KIF
- CGIF - Conceptual Graph Interchange Format
- XCL - eXtended Common Logic Markup Language, based on XML

Other important languages could also be defined as dialects. Among them are the RDF and OWL languages (defined by the W3C), SQL, Prolog, OCL, Datalog, RuleML, Controlled English, Controlled Chinese, Controlled Spanish and UML.

In this talk we will discuss the abstract syntax, the semantics and the key features of CL. We will focus on the metamodel [1] of the abstract syntax using UML notation. We will also provide the concrete syntax (dialect) of Petri nets demonstrating the use of the CL approach.

References

- [1] M. Ferenczi, A. Pataricza, and L. Rónyai, editors. Formal methods in computing. Akadémiai Kiadó, 2005.
- [2] Information technology - Common Logic (CL): a framework for a family of logic-based languages ISO/IEC Standard, Reference number: 24707:2007(E).
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